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EXAMINER

TRIMMINGS, JOHN P

ART UNIT	PAPER NUMBER
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2133

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DATE MAILED: 09/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/884,312

Applicant(s)

KELLER, RICHARD B.

Examiner

John P Trimmings

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 6/18/2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☐ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-27 is/are rejected.
- 7) ☒ Claim(s) 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claims 1 – 27 are presented for examination.

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: Figure 2; "Data~200". A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: Figure 4a; [63:0], [56:0], [48:0], and [40:0]. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
3. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: Figure 4b; [64:0]. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

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4. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: Figure 5a; [63:0], [56:0], [48:0], and [40:0]. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
5. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: Figure 5b; [64:0]. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
6. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: Figure 5b; "~522b". A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.
7. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: Figure 5b; "Mux ~530", "Mux ~532", "Mux ~534". A proposed drawing correction, corrected drawings, or amendment to the specification to add the

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reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

8. The drawings are objected to because Figure 5a title states "CRC Calc (8-5 bytes)...", but should probably state "CRC Calc (4-1 bytes)...". A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

9. The drawings are objected to because Figure 5b title states "CRC Calc (8-5 bytes) ~304", but should probably state "CRC Calc (4-1 bytes) ~306a/306b". A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

10. The disclosure is objected to because of the following informalities: Page 7 line 9 states "Fig. 2", but the examiner believes it should state "Fig. 3". Appropriate correction is required.

11. The disclosure is objected to because of the following informalities: Page 7 line 23 states "402-408", but the examiner believes it should state "402, 404, 406, and 408". Appropriate correction is required.

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12. The disclosure is objected to because of the following informalities: Page 8 line 5 states "402-408", but the examiner believes it should state "402, 404, 406, and 408". Appropriate correction is required.

13. The disclosure is objected to because of the following informalities: Page 8 lines 5 and 6 contain words within open and closed parenthesis, but the examiner believes that the parenthesis are not needed. Appropriate correction is required.

14. The disclosure is objected to because of the following informalities: Page 8 line 11 states "422-426", but the examiner believes it should state "422, 424, 426". Appropriate correction is required.

15. The disclosure is objected to because of the following informalities: Page 8 line 12 states "432-434", but the examiner believes it should state "432 and 434". Appropriate correction is required.

16. The disclosure is objected to because of the following informalities: Page 8 line 20 states "402-406", but the examiner believes it should state "422, 424, and 426". Appropriate correction is required.

17. The disclosure is objected to because of the following informalities: Page 8 line 24 states "iteration", but the examiner believes it should state "iterations". Appropriate correction is required.

18. The disclosure is objected to because of the following informalities: Page 8 line 25 states "422-428", but the examiner believes it should state "422, 424, and 426". Appropriate correction is required.

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19. The disclosure is objected to because of the following informalities: Page 9 line 13 states "502-508", but the examiner believes it should state "502, 504, 506, and 508". Appropriate correction is required.
20. The disclosure is objected to because of the following informalities: Page 10 line 10 states "608/610", but the examiner believes it should state "606/610". Appropriate correction is required.
21. The disclosure is objected to because of the following informalities: Page 9 line 18 refers to 524b and 528 in Figure 5b, but they do not exist in the drawing. Appropriate correction is required.
22. The disclosure is objected to because of the following informalities: Page 9 line 19 refers to 552b in Figure 5b, but it does not exist in the drawing. Appropriate correction is required.

Claim Objections

23. Claim 20 is objected to because of the following informalities: Line 8 in the claim contains the words "...flows, the at least..." which the examiner finds difficult to understand. A more appropriate word should be substituted for the "the" in order to give meaning to the sentence. Appropriate correction is required.

Claim Rejections - 35 USC § 112

24. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

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25. Claims 5, 16, and 24 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: Claims 5, 16, and 24 establish a dependent relationship on the first claims 2, 13, and 21 respectively and which first claims are subject to groups of words less than or equal to $n/2$. However, the claims 5, 16, and 24 are specified to operate only on groups of words greater than $n/2$. There can be no linkage between the dependent claims (5, 16, and 24), which require words greater than $n/2$, and the first claims 2, 13, and 21, because the first claims exclude all words greater than $n/2$.

26. Claims 6, 17, and 25 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: Claims 6, 17, and 25 establish a dependent relationship on the claims 5, 16, and 24 respectively and which claims are subject to groups of words less than or equal to $n/2$ as per the first claims 2, 13, and 21 respectively. There can be no linkage between the dependent claims (5, 16, and 24), which require words greater than $n/2$, and the first claims 2, 13, and 21, because the first claims exclude all words greater than $n/2$.

27. Claims 7, 18, and 26 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential structural cooperative

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relationships of elements, such omission amounting to a gap between the necessary structural connections. See MPEP § 2172.01. The omitted structural cooperative relationships are: Claims 7, 18, and 26 establish a dependent relationship on the claims 5, 16, and 24 respectively and which claims are subject to groups of words less than or equal to $n/2$ as per the first claims 2, 13, and 21 respectively. There can be no linkage between the dependent claims (5, 16, and 24), which require words greater than $n/2$, and the first claims 2, 13, and 21, because the first claims exclude all words greater than $n/2$.

28. Claim 9 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 9 does not further define or alter the contents of claim 1. Both claims provide the same function, which is selectors, which re-circulate or output the CRC resultant.

Claim Rejections - 35 USC § 102

29. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

30. Claim 1 is rejected under 35 U.S.C. 102(b) as being fully anticipated by Hubert Shih et al., U.S. Patent No. 4937828. In Shih et al., a cyclic redundancy

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generator is claimed, where parts of the incoming word n are extracted and multiplexed into several crc calculators, where n is more than 1 byte, and where all crc calculations are re-joined in a register which iteratively re-circulates the crc result back to the input to be multiplexed and calculated again, and another register also serves as an output for the final crc result, all as per Shih et al. claims 1 and 5. Excerpts from Shih et al. claim 1 are as follows; "A cyclic redundancy generator for generating cyclic redundancy check bits for each frame of input data..."; "...data register means, having a first parallel input operatively connected to receive the input data and a second parallel input and a parallel output, for storing transmit data..."; "...for supplying the updated cyclic redundancy check bits to said data register means for storage therein after generating the updated cyclic redundancy check bits...". As for Shih et al. claim 5; "...said data register means comprises: a first multiplexor having a first parallel input operatively connected to receive a first portion of the input data, a second parallel input operatively connected to said logic means to receive a first portion of the updated cyclic redundancy check bits...". Also, Shih et al. diagram FIG. 3 shows the input data bus which is supplying the data to be calculated as being 16 bits wide, 2 bytes. The above two claims and diagram FIG. 3 of Shih et al. specifically teach the applicant's claim 1.

31. Claims 12 - 15 are rejected under 35 U.S.C. 102(b) as being fully anticipated by IBM Technical Disclosure Bulletin NN901051, dated October 1, 1990. In NN901051, a parallel method for computing cyclic redundancy checks is disclosed, where parts of the incoming word n are extracted and multiplexed into

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different crc calculators based on whether the word size is less than or equal to $n/2$, where n is more than 1 byte, and where all crc calculations are re-joined in a register which iteratively re-circulates the crc result back to the input to be multiplexed and calculated again, and another register also serves as an output for the final crc result, all as per IBM Technical Disclosure Bulletin NN901051.

Quotes from NN901051 are as follows; "For parallel implementation, a frame size that is a multiple of eight bits is assumed."; "The data bus enable signals gate the data so that if only half the data bus (8bits) is valid, the correct half of the bus is presented to the 8-bit CRC logic."; "...the content of the register is altered by the feedback equation." See also Figure 1 which identifies the components such as the multiplex, crc generator, and storage/feedback components.

Claim Rejections - 35 USC § 103

32. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

33. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Guido Albertengo and Riccardo Sisto, Politecnico di Torino, "Parallel CRC Generation", IEEE Micro 0272-1732/90/1000-0063501.00, October, 1990, pp 63-71. Albertengo et al. describes a crc generator consisting of the combination of crc generator chips, staged and gated according to word size, to operate in a parallel word-wise manner, and a register to re-circulate calculations (pp 67 & 68) for the purpose of generating crc words on data flowing through a network. Albertengo et al. writes that "We actually implemented this error control system on a dedicated 160 Mbit/s synchronous bus for a real-time application, the implementation of a multichannel LAN interface", (page 70). Not specifically claimed in Albertengo et al. was the processing of a "plurality of network traffic flows". But, as per the page 70 quote above, the apparatus was implemented on a multichannel LAN interface. A person with ordinary skill in the art at the time of the invention, would find that LANs and networks are synonymous, and that a LAN interface would be part of a network traffic flow. One would be motivated to apply this apparatus to a network in the same manner as with a LAN in order to make this crc generator available to as many applications as possible.

34. Claims 2 - 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hubert Shih et al., U.S. Patent No. 4937828, as applied to claim 1 above, and further in view of IBM Technical Disclosure Bulletin NN901051, dated October 1, 1990. The crc generator described by Shih et al. does not fully satisfy

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all of the points presented by the applicant's claims 2 – 4, such as the use of multiple crc calculators in cascade. NN901051 however describes and teaches the calculations (see entire bulletin) as a parallel method for computing cyclic redundancy checks, where parts of the incoming word n are extracted and multiplexed into different crc calculators based on whether the word size is less than or equal to $n/2$, where n is more than 1 byte. The act of selectively employing $n/2$ calculators is also evident, because in this case of the IBM Disclosure, the value of n is 2, and selecting one or the other calculator in NN901051 means that $n/2$ calculators are utilized. One skilled in the art at the time of the invention, being motivated to increase effectiveness of crc generation, would combine the two inventions above, which would have accomplished the effect of the applicant's claims 2 – 4.

30. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hubert Shih et al., U.S. Patent No. 4937828, as applied to claim 1 above, and further in view of IBM Technical Disclosure Bulletin NN901051, dated October 1, 1990. The crc generator described by Shih et al. does not fully satisfy all of the points presented by the applicant's claims 2 – 4, such as the use of multiple crc calculators in cascade. NN901051 however describes and teaches the calculations (see entire bulletin) as a parallel method for computing cyclic redundancy checks, where parts of the incoming word n are extracted and multiplexed into different crc calculators based on whether the word size is less than or equal to $n/2$, where n is more than 1 byte. The act of selectively employing $n/2$ calculators is also evident, because in this case of the IBM

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Disclosure, the value of n is 2, and selecting one or the other calculator in NN901051 means that $n/2$ calculators are utilized. One skilled in the art at the time of the invention, being motivated to increase effectiveness of crc generation, would have added more bytes to the invention (increase n), and would have combined the two inventions above, which would have accomplished the effect of satisfying the applicant's claims 5 and 6.

35. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hubert Shih et al., U.S. Patent No. 4937828. The crc generator as fully disclosed by Shih et al., and further described in the applicant's claim 10 as being an 8-byte word crc generator, is a logical extension of applying scale to the basic premise of Shih et al. It would have been obvious to one skilled in the art at the time the invention was made to apply the same generator premise to multiple instantiations (increase n). One having ordinary skill in the art would have been motivated to do so in order to increase the capacity of crc generation by 10x to 100x.

36. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hubert Shih et al., U.S. Patent No. 4937828. The crc generator as fully disclosed by Shih et al., and further described in the applicant's claim 11 as being an integrated circuit, is what a mass producer would do in anticipation of mass production of such an invention. Any person skilled in the art at the time of the invention, designing and implementing such large scale functioning unit, would have been trained to complete the invention in the form of an integrated circuit.

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Therefore, it would have been obvious to one skilled in the art at the time of the invention to specify that any finished product be reduced to an integrated circuit.

37. Claims 21 - 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guido Albertengo and Riccardo Sisto, Politecnico di Torino, "Parallel CRC Generation", IEEE Micro 0272-1732/90/1000-0063501.00, October, 1990, pp 63-71, as applied to claim 20 above (paragraph 33), and further in view of Hubert Shih et al., U.S. Patent No. 4937828 as applied to claim 21 of the applicant, and further in view of IBM Technical Disclosure Bulletin NN901051, dated October 1, 1990. The crc generator for network traffic flow, described by Albertengo et al. (pp 67 & 68) is further described by IBM Technical Disclosure NN901051 as a parallel method for computing cyclic redundancy checks (see entire bulletin), where parts of the incoming word n are extracted and multiplexed into different crc calculators based on whether the word size is less than or equal to $n/2$, where n is more than 1 byte. The act of selectively employing $n/2$ calculators is also evident, because in this case, the value of n is 2, and selecting one or the other calculator in NN901051 means that $n/2$ calculators are utilized. The applicant's claims 21 - 23 are fully anticipated by the association of NN901051 with Albertengo et al.

38. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hubert Shih et al., U.S. Patent No. 4937828 and further in view of IBM Technical Disclosure Bulletin NN901051, dated October 1, 1990. The crc generator as fully disclosed by Shih et al. and NN901051 as being a multiple word-wise crc generator is made further parallel by duplicating the generator in order to process

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a second word group, in a parallel operation. It would have been obvious to one skilled in the art at the time of the invention, to provide a duplicate circuit in order to double crc generation performance. One would have been motivated to do so in order to take advantage of massive scale in order to improve performance.

39. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over IBM Technical Disclosure Bulletin NN901051, dated October 1, 1990. The crc generator as fully disclosed by NN901051 as being a multiple word-wise crc generator is made further parallel by duplicating the generator in order to process a second word group, in a parallel operation. It would have been obvious to one skilled in the art at the time to provide a duplicate circuit in order to improve crc generation performance. One would have been motivated to do so in order to take advantage of massive scale in order to improve performance.

40. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Guido Albertengo and Riccardo Sisto, Politecnico di Torino, "Parallel CRC Generation", IEEE Micro 0272-1732/90/1000-0063501.00, October, 1990, pp 63-71, and in view of IBM Technical Disclosure Bulletin NN901051, dated October 1, 1990. The crc generator as fully disclosed by Alertengo et al. and NN901051 as being a multiple word-wise crc generator for network traffic flow is made further parallel by duplicating the generator in order to process a second word group, in a parallel operation. It would have been obvious to one skilled in the art at the time to provide a duplicate circuit in order to improve crc generation performance. One would have been motivated to do so in order to take advantage of massive scale in order to improve performance.

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Conclusion

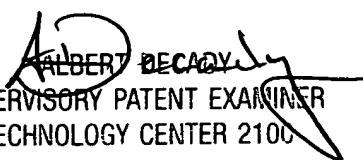
Any inquiry concerning this communication or earlier communications from the examiner should be directed to John P Trimmings whose telephone number is 703-305-0714. The examiner can normally be reached on 8 x 5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on 703-305-9595. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-2394.

John P Trimmings
Examiner
Art Unit 2133

jpt


ALBERT DECADY
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100